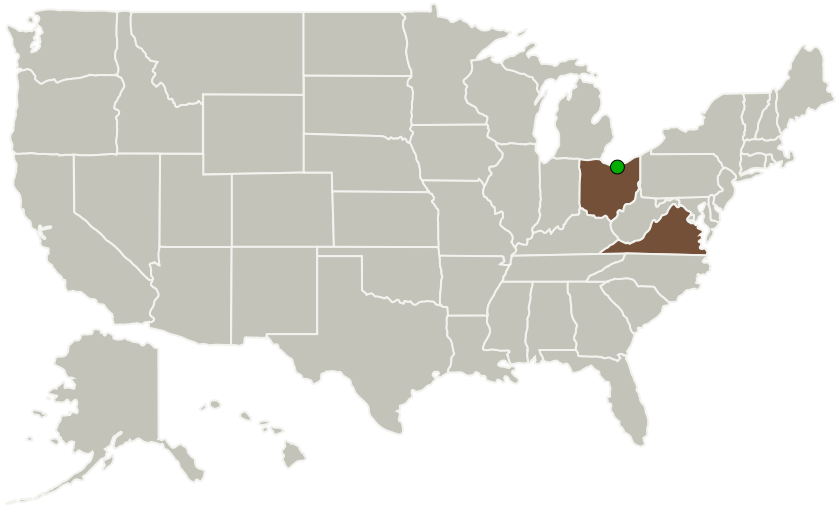
Desensitized Optimal Filtering and Sensor Fusion Tool Kit, Phase I

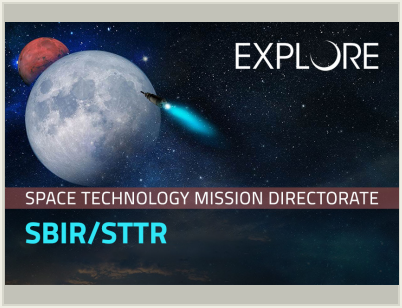
Completed Technology Project (2010 - 2010)

Project Introduction

It is proposed to develop desensitized optimal filtering techniques and to implement these algorithms in a navigation and sensor fusion tool kit. These proposed desensitized optimal filtering techniques include recent advances in robust and/or adaptive generalized Kalman and Sigma-Point filters for non-Gaussian problems with uncertain error statistics, as well as a proposed new technique to desensitize the Kalman filter with respect to parameter uncertainties using a robust trajectory optimization approach called Desensitized Optimal Control. These techniques will be implemented in a relatively generic environment which enables the user to import dynamics and measurement models necessary to apply these filtering techniques to a particular navigation and sensor fusion problem. A variety of sensor models and noise distributions will be available for the user to select, and Monte-Carlo analysis capability will be built into the tool kit to enable statistical performance evaluations. The tool kit will also have a modularized structure so that the modules can be readily integrated with other applications.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Analytical Mechanics Associates, Inc.	Lead Organization	Industry	Hampton, Virginia
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Ohio	Virginia

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Summary: Desensitized Optimal Filtering and Sensor Fusion Tool Kit, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/139981)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Analytical Mechanics Associates, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

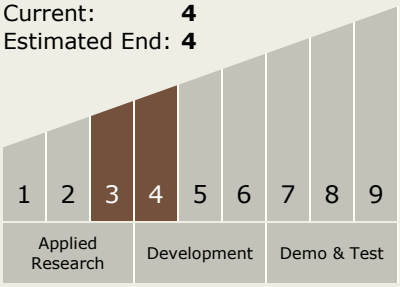
Carlos Torrez

Principal Investigator:

Chris Karlgaard

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
  - TX17.2 Navigation Technologies
    - TX17.2.3 Navigation Sensors

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System